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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/689,488	10/12/2000	Kevin Frank Smith	SJ00-00-044	7862

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EXAMINER

LI, ZHUO H

ART UNIT PAPER NUMBER

2189

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/689,488

Applicant(s)

SMITH, KEVIN FRANK

Examiner

Zhuo H. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7, 8, 12-27 and 29-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 is/are allowed.
- 6) ☐ Claim(s) 1-4, 7-8, 12-19, 21-27 and 29-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

S. Elmore
STEPHEN C. ELMORE
PRIMARY EXAMINER

DETAILED ACTION

Response to Amendment

1. This Office action is in response to the remark and request for consideration filed on March 31, 2005. Claims 1-4, 7-8, 12-27 and 29-32 are pending in the application.
2. The Declaration with related documents filed on March 31, 2005 under 37 CFR 1.131 is sufficient to overcome the Datta (U.S. Patent Number 6,622,168) reference.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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4. Claims 1-4, 7-8, 12, 19, 21-24 and 29-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Pirolli et al (US PAT. 6,098,064 hereinafter Pirolli).

Regarding claim 1, Pirolli discloses a method for scheduling prefetches into a cache, i.e., 208, figure 4, of a data storage system, i.e., network computer system as defined in figure 1, the method comprising remotely modeling dynamic operation of the cache in a module, i.e., proxy server (112, figure 3), the proxy server including a model, i.e., cache (208, figure 3) of data elements currently stored with the cache (col. 5 lines 3-25, col. 10 line 24-41 and col. 11 lines 37-51), assigning a priority value to modeled data elements according to their history, assigning a priority value to a requested data element based at least partially on whether a preceding data element is present in the cache (col. 5 lines 15-51, col. 6 line 33 through col. 7 line 7 and figure 6), making a cache management decision based upon the model, i.e., whether the requested data is hit in the cache or miss in the cache (figure 8) by the cache manager (207, figure 3), and executing prefetches into the cache in response to select cache management decisions (col. 10 lines 24-41).

Regarding claim 2, Pirolli discloses the method wherein making a cache management decision comprises examining a request for a data element from a stream of input/output data request passed between a host, i.e., client computer (102, figure 3) and a storage device, i.e., disk array (226), tape (224), or optical storage (222) in figure 4, of the data storage system (col. 6 lines 33-44), and determining whether to schedule a prefetch of a data element logically successive to the requested data element in accordance with contents of the cache as indicated by the remote module (col. 5 lines 15-51, figure 8 and col. 10 lines 24-64).

Regarding claim 3, Pirolli discloses the method wherein the cache is least recently used cache (col. 6 line 62 through col. 7 line 7 and col. 8 lines 14-32).

Regarding claim 4, Pirolli discloses the method wherein the LRU cache is a native LRU-only cache, and further comprising the step of leaving the native LRU-only cache substantially unmodified (col. 6 line 33 through col. 7 line 7 and col. Col. 10 lines 12-64).

Regarding claim 7, Pirolli discloses the method wherein remotely modeling the cache further comprising determining a size of the cache (col. 10 lines 33-41), periodically fetching an I/O rate of the cache, and periodically fetching a hit rate of the cache, i.e., determining the documents stored in the cache should be deleted based on the needs list record, and the needs list is sorted by highest need probability (col. 10 line 14-64), and the related documents or relevant context are retrieved from the cache by the history factor and needs list based on the requested by the client computer (col. 9 lines 5-20).

Regarding claim 8, Pirolli discloses the method wherein remotely modeling the cache further comprises periodically calculating a single reference residency time for a data element within the cache (col. 6 line 62 through col. 7 line 7 and col. 8 lines 25-32).

Regarding claim 12, Pirolli discloses the method wherein assigning a priority value further comprises assigning a priority value, i.e., adding to the needed list, comprising the priority value assigned to the preceding data element plus one when the preceding data element is found to be present in the cache (col. 10 lines 12-23).

Regarding claim 19, Pirolli discloses the method wherein making a cache management decision comprises deciding to schedule a prefetch, i.e., via the prefetch and cache module (202, figure 3), and further comprising scheduling a prefetch by sending and input/output request to

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the cache i.e., whether the requested data is hit in the cache or miss in the cache (figure 8) by the cache manager (207, figure 3), and executing prefetches into the cache in response to select cache management decisions (col. 10 lines 24-41).

Regarding claim 21, Pirolli discloses a data prefetch scheduling system comprising a cache (208, figure 4), configured to communicate with a host, i.e., client computer (102), and a remote prefetch module, i.e., proxy server configured to communication with the host and the cache (figure 3) and further configured to determine whether to schedule a prefetch of data into the cache, wherein the determination to prefetch data is at least partially determined based on whether the data element preceding a request data element is present in the cache (col. 10 lines 24-41), a modeling module operating within the remote prefetch module configured to model the cache, including providing a module (208, figure 3) of data element currently stored within the cache (col. 5 lines 3-25, col. 10 line 24-41 and col. 11 lines 37-51), wherein each data element is assigned a priority value according to its history (col. 5 lines 15-51, col. 6 line 33 through col. 7 line 7 and figure 6), and a prefetch request module configured to request a data input/output from the cache when the remote prefetch module determines that a prefetch is to be conducted, i.e., prefetch and store the data into the cache based on the history factor and the priority value, which is stored in the needed list with the related documents or relevant context are retrieved from the cache by the history factor and needs list based on the requested by the client computer (col. 9 lines 5-20) and (col. 10 lines 13-64 and figures 7& 8).

Regarding claim 22, the limitations of the claim are rejected as the same reasons set forth in claim 3.

Regarding claim 23, the limitations of the claim are rejected as the same reasons set forth in claim 4.

Regarding claim 24, Pirolli discloses the data prefetch scheduling system wherein the remote prefetch module further comprises a calculation module configured to compare the priority value assigned to a data element to a threshold value and determine whether to schedule a prefetch of the data element (col. 5 line 15-46 and col. 6 line 63 through col. 7 line 7).

Regarding claim 29, Pirolli discloses a remote prefetch module, i.e., proxy server (112, figure 3) for determining whether to schedule a prefetch of data into a cache (208, figure 4) of a computer system, i.e., network computer system (figure 1), the prefetch module comprising a modeling module, i.e., prefetch and cache module (202, figure 3) configured to model dynamic operation of the cache wherein the modeling module is further configured to provide a model (208, figure 3) of data elements currently stored with the cache (col. 5 lines 3-25, col. 10 line 24-41 and col. 11 lines 37-51), wherein each data element is assigned to a priority value according to its history and requested data elements are assigned a priority value based at least partially on whether a preceding data element is present in the cache (col. 5 lines 15-51, col. 6 line 33 through col. 7 line 7 and figure 6), and a calculation module, i.e., cache manager (207, figure 3) configured to make a cache management decision based upon the model, wherein the cache management decision is at least partially determined based on whether a data element preceding a requested data element is present in the cache (col. 10 lines 24-41).

Regarding claim 30, the limitations of the claim are rejected as the same reasons set forth in claim 29.

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Regarding claim 31, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 32, the limitations of the claim are rejected as the same reasons set forth in claim 21.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 13-14 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pirolli et al (US PAT. 6,098,064 hereinafter Pirolli) in view of Dixon et al. (US PAT. 4,490,782 hereinafter Dixon).

Regarding claims 13-14, Pirolli differs from the claimed invention in not specifically teaches the method wherein determining whether to schedule a pre-fetch of a element further comprises comparing the priority value of the requested element with a dynamic threshold and the pre-fetching the requested data element into the cache if the priority value of the requested data element is greater than the dynamic threshold. However, Dixon teaches cache system with pre-fetch determined by requested record's position within data block comprising the steps of assigning a priority position to a requested data element in order to determine whether to schedule a pre-fetch of a data element by comparing the priority value of the requested with dynamic threshold and pre-fetching the requested data element when the priority value is greater

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than the dynamic threshold (col. 15 line 46 through col. 18 line 59). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the network system of Pirolli in having method step of determining whether to schedule a pre-fetch of a element further comprises comparing the priority value of the requested element with a dynamic threshold and the pre-fetching the requested data element into the cache if the priority value of the requested data element is greater than the dynamic threshold, as per teaching of Dixon, because it provides a data processor with substantially increased operating speed wherein the cache without the necessity of examining the entire contents of the cache, which increases efficiency by transferring to the cache memory certain additional data other than that already requested by the host processor (col. 2 lines 33-50).

Regarding claims 25-27, the limitations of the claims are rejected as the same reasons set forth in claims 13-14.

7. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pirolli et al (US PAT. 6,098,064 hereinafter Pirolli) in view of Weinberger et al. (US PAT. 6,453,389 hereinafter Weinberger).

Regarding claims 15-18, Pirolli differs from the claimed invention in not specifically teaches periodically re-evaluating the performance of the cache model comprising the steps of determining whether the dynamic threshold used in the internal model of the cache accurately models the performance of the cache by comparing the performance of the dynamic threshold with an alternate dynamic threshold. However, Weinberger teaches the computer system comprising a pre-fetch apparatus (300, figure 4) recursively reevaluate the performance of the

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cache by the same determination and compare steps (col. 7 lines 16-60 and col. 16 lines 6-52).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the network system of Priolli in the pre-fetch method of periodically re-evaluating the performance of the cache model comprising the steps of determining whether the dynamic threshold used in the internal model of the cache accurately models the performance of the cache by comparing the performance of the dynamic threshold with an alternate dynamic threshold, as per teaching by the computer system of Weinberger, because it minimize the data missed of the memory accessing operation and prevent the computer system stalls (col. 2 lines 50-53).

Allowable Subject Matter

8. Claim 20 is allowed.

Response to Arguments

9. Applicant's arguments with respect to claims 1-4, 7-8, 12-19, 21-27 and 29-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhuo H. Li whose telephone number is 571-272-4183. The examiner can normally be reached on M-F 9:00am - 6:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zhuo H. Li



Patent Examiner
Art Unit 2189


STEPHEN C. ELMORE
PRIMARY EXAMINER